What is claimed is:

1. A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 1 atom from the resin backbone; and

applying ions to the substrate.

2. A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties in an amount of 12 mole percent or less, based on total units of the resin; and

applying ions to the substrate.

3. A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction; and

applying ions to the substrate.

4. A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid; and

applying ions to the substrate.

5. A method for providing an ion-implanted semicopnductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, photoacid-labile groups that generate upon photoactivation a cleavage product that comprises 5 or more carbon atoms and/or a single or multiple ring structure; and

applying ions to the substrate.

6. A method for providing an ion-implanted semicopnductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

treating the photoresist composition image thermally or with radiation to remove volatile materials of the photoresist composition; and

applying ions to the substrate.

7. A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

treating the photoresist composition image to provide a coating thereon; and

applying ions to the substrate.

8. A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 1 atom from the resin backbone; and

the wafer having applied dopant ions.

9. A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties in an amount of 12 mole percent or less, based on total units of the resin; and

the wafer having applied dopant ions.

10. A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction; and

the wafer having applied dopant ions.

11. A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid; and

the wafer having applied dopant ions.

12. A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, photoacid-labile groups that generate upon photoactivation a cleavage

product that comprises 5 or more carbon atoms and/or a single or multiple ring structure; and

the wafer having applied dopant ions.

13. A coated substrate comprising:

a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that is coated; and

the wafer having applied dopant ions.

14. A coated substrate of any one of claims 8 through 13 wherein the photoresist composition coating has a dried layer thickness of about 3 microns or greater.

15. A chemically-amplified positive-acting photoresist composition that comprises one or more photoacid generator compounds and a resin that comprises units that contain photoacid-labile moieties in an amount of 8 mole percent or less, based on total units of the resin.

16. A chemically-amplified positive-acting photoresist composition that comprises one or more photoacid generator compounds and a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction.

17. A chemically-amplified photoresist comprising one or more photoacid generator compounds and one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid.

18. A chemically-amplified positive-acting photoresist composition that comprises one or more photoacid generator compounds and a resin that comprises units that contain photoacid-labile moieties in an amount of 8 mole percent or less, based on total units of the resin.

19. A chemically-amplified positive-acting photoresist composition that comprises one or more photoacid generator compounds and a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction.